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Entrepreneurship Capital and Entrepreneurial Disparities: A Longitudinal Panel Data Analysis of Asia-Oceania Region

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Abstract

The study examines the causes of the persistence gap in entrepreneurial activity across the Asia-Oceania nations. Furthermore, this study also analyses the temporal impact of expenses on research and development in terms of opportunity, necessity, and overall early entrepreneurial activities. This study employed panel data regression techniques for 24 Asian-Oceania countries from 2005 to 2020. The random effect model results indicate that expenditures on research and development, personal entrepreneurial objectives, and the quantity of established enterprises are the primary determinants of the variation in entrepreneurial activities across countries. Furthermore, research and development spending promotes the emergence of opportunity entrepreneurs in the economy. This research contributes to academic knowledge and provides practitioners with insights to promote research and development activities that enhance entrepreneurial activity and the business environment across nations.

Key words; Entrepreneurship capital, entrepreneurial disparities, total early, necessity, opportunity entrepreneurs,

JEL Code; L26, M13, O31

Introduction

Entrepreneurship is widely accepted as essential to economic growth, innovation, and social transformation worldwide (Chowdhury, 2025). Diverse institutional environments, cultural contexts, and levels of economic development influence the complex dynamics of entrepreneurial activity in the Asia-Oceania region (ADB, 2022). Some economies in this region have effectively developed entrepreneurial ecosystems that enhance competitiveness and job creation, while others face persistent structural barriers that restrict entrepreneurial participation (ESCAP, 2024). The uneven landscape emphasises the importance of analysing entrepreneurship capital, which encompasses collective resources, networks, and institutional supports that facilitate entrepreneurial activity as a factor influencing both growth and disparities in entrepreneurial outcomes. Within the framework of the capability approach, entrepreneurial capital is conceptualised as enhancing individuals' freedom to engage in

entrepreneurial activities, thus connecting entrepreneurial inequalities to wider issues of social justice and inclusive development (Sen, 1999; Alam et al., 2024).

Entrepreneurship capital includes not only individual competencies and organisational resources but also broader socioeconomic and institutional frameworks that support entrepreneurial activities (HRMARS, 2019). This encompasses access to finance, supportive regulatory frameworks, human capital, and cultural attitudes regarding risk-taking and innovation (Alekhina & Ganelli, 2020). The Asia-Oceania region exhibits significant heterogeneity in entrepreneurship capital, encompassing advanced economies such as Japan and Australia alongside emerging markets like India, Indonesia, and Vietnam (Baskaran et al., 2019). Disparities frequently result in unequal opportunities for entrepreneurs, thereby exacerbating gaps in productivity, income distribution, and regional development. The Inclusive Growth Theory posits that equitable distribution of entrepreneurship capital is essential for ensuring that growth benefits are shared across gender, class, and regional divides (Alekhina & Ganelli, 2020). Human capital theory emphasises that investments in education, skills, and digital inclusion are essential for mitigating entrepreneurial disparities, especially among women and marginalised groups (World Economic Forum, 2025; Mohammed et al., 2025).

Although there is an increasing body of literature on entrepreneurship and inclusive growth, empirical research explicitly quantifying entrepreneurship capital and its influence on entrepreneurial disparities in the Asia-Oceania region is still limited (Chowdhury, 2025). Existing research predominantly emphasises single-country case studies or cross-sectional analyses, which do not adequately reflect the dynamic characteristics of entrepreneurial ecosystems (Alam et al., 2024). Researchers have studied the disparity in entrepreneurial activities among nations through a variety of lenses. Contributing to the entrepreneurial literature, the current study analyses variation using the knowledge spillover theory of entrepreneurship (KSTE).

The study explains how newly created knowledge helps in generating entrepreneurial opportunities. Further, the study also explains the type of entrepreneurial activity created by knowledge generation and spillover. Moreover, it aims to identify the factors that influence both necessity and opportunity entrepreneurs over different time frames. A panel data approach provides a robust framework for examining temporal variations and country-specific heterogeneity (HRMARS, 2019). This study uses panel econometric techniques to examine the

impact of entrepreneurial capital on regional entrepreneurial disparities, contributing to theoretical insights and informing policy design for inclusive and sustainable entrepreneurial development.

This paper follows a structured format with distinct sections. Section one introduces the study. Section two reviews previous academic work relevant to the study area. Section three provides the detailed theoretical framework of the study. Section four details the required data and methodology employed to achieve the study's objective. Section five presents the results and discussion, as well as the limitations of the study. The final section provided the conclusions.

Literature Review

The existing literature on entrepreneurship capital, entrepreneurial disparities and Asia-Oceania countries is classified into three major categories: entrepreneurship and economic growth, entrepreneurship capital and entrepreneurial disparities. Literature has extensively explored the relationship between entrepreneurship and economic growth (Galvo et al., 2017; Acs and Sanders, 2012). Alfalih and Ragmoun (2020) have recognised entrepreneurship as the principal catalyst for economic growth and development. Furthermore, Acs & Audretsch (2005) and Schumpeter (1934) found that entrepreneurship fosters innovative resource combinations and enhances market competition. Entrepreneurship also played a key role in closing the gap between rich and poor regions by encouraging new ideas, new technologies, and new jobs. Additionally, Audretsch et al. (2015) and Fritsch & Schroeter (2011) reported that despite comparable levels of economic development, firm birth rates vary significantly across countries.

Literature on the causes of entrepreneurial differences among nations focused on regional characteristics of entrepreneurship and is divided into supply-side and demand-side elements. Available literature focuses on supply-side factors, including financial and human capital availability, urbanisation, and population dynamics, while demand-side factors include economic development, industrial clustering, and technological change (Spigel, 2017; Verheul et al., 2002). Variations in local conditions appear to widen the gap in entrepreneurial activity between different regions. This growing disparity is why governments are becoming more interested in developing specific strategies to promote entrepreneurship within their regions. Later, Hong et al. (2015) describe spatial heterogeneity and temporal and spatial dependence as the major determinants of entrepreneurship formation in an economy. Furthermore, nations differ in their capacity to initiate, support, and sustain entrepreneurial activity (Wennekers &

Thurik, 1999; Acs & Audretsch, 1988). Bosma and Sternberg (2017) found that there are notable spatial disparities in entrepreneurial activity and attitudes in various locations that persist over time. Thus, it is still crucial to understand the underlying factors for the variations in entrepreneurial activities across the nations (Stenholm et al., 2013).

Literature on region-specific characteristics associated with spatial heterogeneity was found crucial in promoting economic activity growth, mainly in resource-based entrepreneurship (Audretsch & Keilbach, 2004; Pijnenburg & Kholodilin, 2014). Temporal dependence asserts that present economic activity levels are influenced by historical levels, establishing a self-reinforcing dynamic (Zucker et al., 1998; Andersson & Koster, 2011; Fritsch & Mueller, 2007). This concept explains the path-dependent nature of entrepreneurial activities, where prior policies and institutions influence the present entrepreneurial landscape (Martin & Sunley, 2006). Spatial dependency, conversely, highlights regional interconnectedness as a driver of entrepreneurship (Plummer, 2010), suggesting that entrepreneurial promotion in neighbouring countries can generate spillover effects. Understanding the country-specific nature of economic activity requires analysing spatial heterogeneity and temporal dependence (Pijnenburg & Kholodilin, 2014).

Entrepreneurship capital describes the capacity of a region to give rise to entrepreneurial behaviour, specifically the establishment of new businesses in the locality (Audretsch & Keilbach, 2004). It includes human capital and economic opportunities that encourage entrepreneurship. Along with that, it incorporates cultural traditions and institutions that promote entrepreneurship in the region. Therefore, the region's entrepreneurship capital determines the number of entrepreneurs an economy can produce.

Recent research highlights factors influencing entrepreneurial activity, such as institutional voids in South Asia and robust ecosystem support in East Asia and Oceania (Bashir & Sajid, 2022). However, the literature is fragmented, frequently emphasising country-specific contexts over comparative or longitudinal analyses. Entrepreneurship capital currently encompasses human, social, and institutional resources; however, existing literature seldom integrates these elements into cohesive frameworks to elucidate regional disparities (Myoda & Petalcorin, 2022). Recent research highlights the distinct cultural and institutional characteristics of Asia, such as collectivist traditions and funding challenges; however, there is a lack of systematic investigation into how these factors contribute to differences between Asia and Oceania (Wu, Si, & Liu, 2022).

Entrepreneurship capital is essential for comprehending innovation and equitable growth in the Asia-Oceania region; however, disparities in finance, institutional quality, education, and digital infrastructure remain evident. This gap underscores the necessity for cross-country panel data analyses and conceptual advancements that connect entrepreneurial capital to unequal outcomes, particularly in under-represented contexts such as Pacific Island economies with insufficiently studied entrepreneurial ecosystems.

Theoretical Framework

Knowledge spillover theory of entrepreneurship (KSTE)

The Knowledge Spillover Theory of Entrepreneurship (KSTE), developed by Audretsch and Keilbach (2005), argues that entrepreneurial opportunities frequently arise from unutilised or inadequately commercialised knowledge created within firms, universities, or research institutes. Entrepreneurs serve as intermediaries, converting these spillovers into innovations and new enterprises. Both market demand and the availability and distribution of knowledge influence entrepreneurship, according to the theory. This view presents entrepreneurs as essential in the commercialisation of ideas and the mitigation of inefficiencies in knowledge applications.

KSTE (Knowledge Spillover Theory of Entrepreneurship) posits that newly created ideas and knowledge are the primary sources of entrepreneurial opportunities (Audretsch et al., 2007; Acs et al., 2004; Acs & Armington, 2006). According to KSTE, organizations such as firms and university research institutions are responsible for generating new ideas. However, due to the uncertainties associated with these newly created pieces of knowledge, commercialization often does not occur, resulting in entrepreneurial opportunities. The incomplete commercialization of new knowledge within an organization can lead to the creation of a new firm that seeks to exploit this untapped knowledge (Audretsch et al., 2006). The establishment of such a firm facilitates the transfer of this new knowledge from the original knowledge-generating institution to the enterprise that aims to commercialize it (Audretsch & Keilbach, 2007).

Knowledge spillover

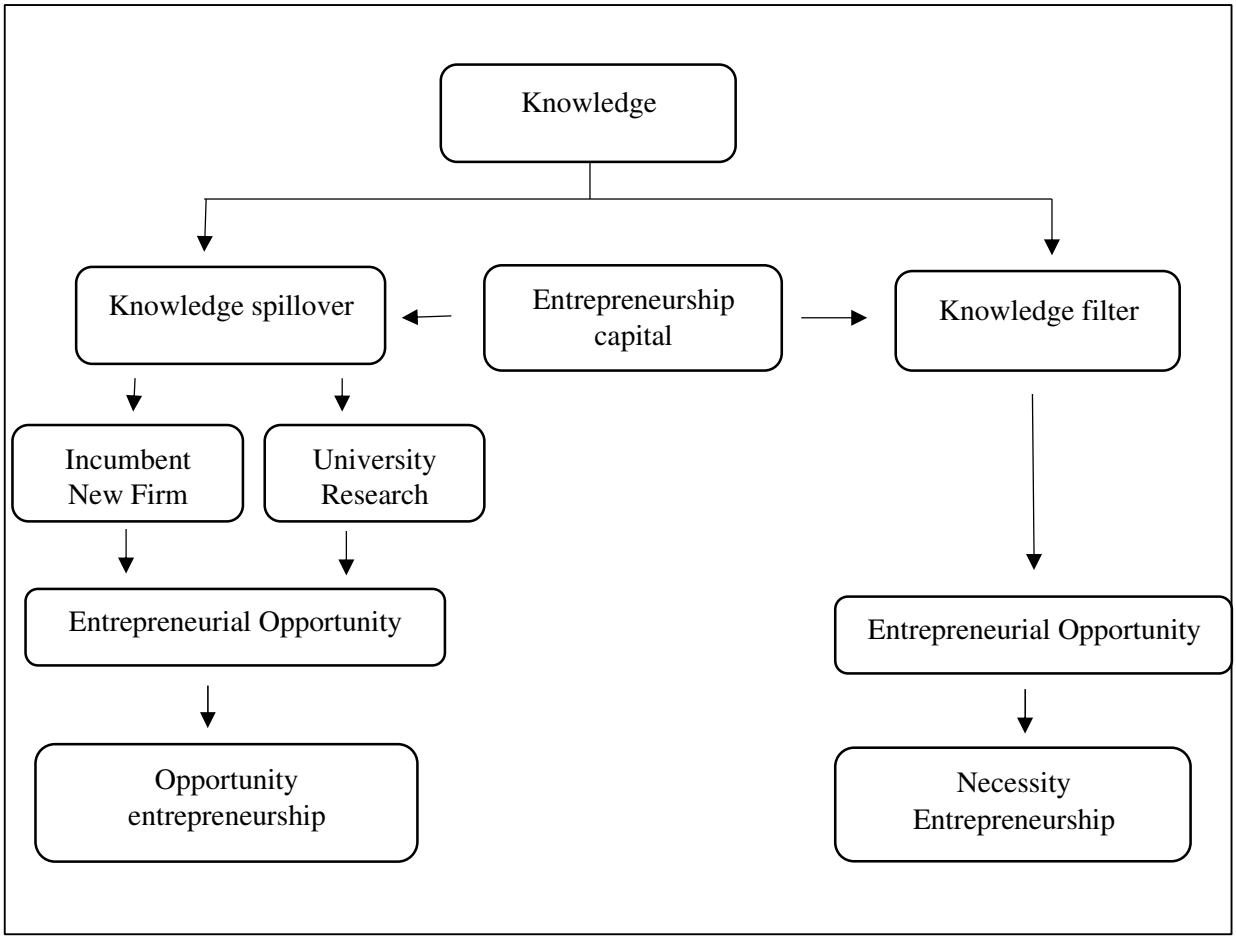
Incumbent firms and newly established ventures both draw on uncommercialized knowledge and convert it into economically valuable knowledge, but differ in how they influence the knowledge spillovers. Incumbent firms tend to internalize new knowledge by embedding it

within their established routines and production processes, thereby raising efficiency and largely absorbing potential spillovers. In contrast, new firms emerge to exploit entrepreneurial opportunities generated by the incomplete or foregone commercialization of such knowledge. Consequently, the creation of new firms functions as an important conduit through which knowledge spillovers are activated and translated into innovation and growth.

The search for entrepreneurial opportunities and the subsequent formation of new firms thus constitutes a mechanism for commercializing partially developed or underutilized knowledge while simultaneously facilitating its diffusion beyond the original organization. In many cases, the founders of these new firms are former employees of knowledge-generating organizations, such as universities, public research institutes, or R&D-intensive corporations. These individuals perceive that the potential economic value of the knowledge they possess exceeds the value attributed to it within the originating organization, which often undervalues or underexplores its commercial applications. To realize this latent potential, employees leave the parent organization and establish new ventures dedicated to the commercialization of the knowledge, thereby transforming it into marketable products or services.

University–industry linkages constitute another key channel through which knowledge is both commercialized and allowed to spill over into the wider economy. Collaborative arrangements such as joint research projects, contract research, consultancy, licensing agreements, and spin-offs from universities enable firms to access cutting-edge scientific and technological knowledge and to convert it into innovations. Empirical studies show that such relationships tend to increase the rate of innovation and are therefore actively promoted by governments seeking to strengthen national and regional innovation systems. When universities generate new knowledge, interaction with industry actors provides a pathway to translate that knowledge into products, processes, and services, thus bridging the gap between academic research and commercial application.

Figure1 Analytical framework



Source: authors formulation

Knowledge filter

A knowledge filter is the barrier that prevents knowledge from being fully transformed into new organizations, procedures, and products. This mechanism restricts the conversion of knowledge into economically valuable applications by both established companies and start-ups. The knowledge filter separates knowledge that has already been commercialised from knowledge that has potential economic value. The difference between commercialized and novel knowledge increases with the effectiveness of the knowledge filter. Due to the knowledge filter, investing in novel knowledge like human capital, R&D, and university research may not directly affect economic growth (Acs et al. (2005).

Entrepreneurship capital

Research on entrepreneurship indicates that the entrepreneurial development process is self-reinforcing, suggesting that the current level of entrepreneurship is influenced by previous

entrepreneurial activity. This phenomenon points to the existence of enduring factors in an economy that support entrepreneurship, commonly referred to as "entrepreneurship capital.". Entrepreneurship capital encompasses the legal, institutional, and social environments that foster entrepreneurial activities within a region. The framework suggests that a knowledge filter can hinder economic growth by limiting knowledge spillover. However, the presence of entrepreneurship capital can reduce this knowledge filter. By diminishing the knowledge filter, the spillover of knowledge is enhanced, subsequently increasing the volume of economic activities within a country. Studies on entrepreneurship reveal a self-reinforcing nature of the entrepreneurial process, implying that past entrepreneurial experiences shape the current level of entrepreneurship.

Within this conceptual landscape, entrepreneurship capital is identified as a discrete form of social capital, specifically orientated towards the promotion of new enterprise creation. It emphasizes social and organizational characteristics that directly contribute to entrepreneurial activity and the emergence of new businesses. Moreover, entrepreneurial capital functions as a channel for knowledge spillovers, facilitating the exchange and dissemination of novel ideas. The amount of entrepreneurial capital determines an economy's ability to produce entrepreneurs. The knowledge spillover will be more pronounced in the region rich in entrepreneurial capital.

Data and Methodology

This research utilises a panel dataset covering 16 years (2005-2020) and comprising 24 Asia-Pacific nations. The dataset was obtained from Global Entrepreneurship Monitoring (GEM), World Development Indicators (WDI), and World Governance Indicators (WGI). Additionally, to tackle the external constraint of data availability in specific nations and timeframes. The dataset becomes an unbalanced panel due to differences in country participation in the GEM surveys across the study period. Standardized collection procedures ensure that constructs and measurements are equivalent (Reynolds et al., 2005).

Furthermore, it has used an unbalanced panel data specification, which may reflect both temporal (2005-2020) and individual (24 Asian nations) dimensions, making it more accommodating. Furthermore, panel data improves the estimates of degrees of freedom and reduces the likelihood of omitted variable bias. It also diminishes the possibility of non-stationarity and provides better forecast (Baltagi, 2008; Gaies et al., 2022).

Dependent Variables

The outcome variables used in the study are measured by the quantity and quality of entrepreneurial activities. From GEM (2005-2020), entrepreneurial activity was measured using Total Early-Stage Entrepreneurial Activity (TEA), which is described as the proportion of the 18-64 age group that is involved in growing entrepreneurship or managing a new firm. GEM defines necessity entrepreneurs (Necessity) as the percentage of entrepreneurs that started their businesses out of necessity. Opportunity entrepreneurs (Opport) are defined as the percentage of entrepreneurs that started their businesses because of an opportunity.

Independent Variables

The analysis makes use of GEM's weighted sample of 2000 persons (aged 18–64) from each participating country. Data from GEM (2005-2020) provides measurements of businesses established (ESTBUS) for more than three years. Entrepreneurial Intention (EINTENTION) is defined as the proportion of the population aged 18 to 64 who intend to start a new firm within the next three years. Fear of failure acts as an important constituent of the entrepreneurship capital of a nation. It is measured as the proportion of the population aged 18-64 who fears starting a new firm due to the risk of failing. Perceived social status of being an entrepreneur (STATUS) is measured as the proportion of the population between 18 and 64 who thinks being an entrepreneur improves social status. The unemployment rate is the percentage of unemployed population in a year, defined as per WDI. The percentage of GDP represents the expenditure on research and development.

Presence of a Role model

The acquaintance with fellow entrepreneurs increases an individual's inclination to become an entrepreneur (Klyver & Grant, 2010). Wagner (2006) argues that necessity entrepreneurs are less likely to have entrepreneurial family members than opportunity entrepreneurs. That is, if there is a successful entrepreneur, then there is a high chance that his family members will also be inclined to become entrepreneurs. Contrary to this, Morales-Gualdrón and Roig (2005) claim that there is no significant variability in the influence of knowing an entrepreneur on a necessity or opportunity entrepreneur.

Opportunity perception

Perceived entrepreneurial opportunities are favourably associated with entrepreneurial activities (Bohlmann et al., 2017). The research indicates that people who foresee business opportunities are more inclined to begin the initial steps of establishing a business. While

Santos et al. (2017) claim that a positive opportunity perception inclines one to establish a new business.

Fear of failure

Fear of failure acts as a significant factor influencing entrepreneurial decisions. Morales-Gualdrón and Roig (2005) argue that the negative relationship between fear of failure and opportunity, as well as necessity entrepreneurship, is more pronounced. Few of the studies claim that entrepreneurs due to necessity are less enthusiastic to take risks than opportunity entrepreneurs (Block et al. 2015; Brünjes and Diez 2013; Wagner 2006).

Entrepreneurial Intentions

Entrepreneurial intentions serve as the foundation for entrepreneurial decisions, influencing choices across multiple periods. Belchior & Lyons (2024) indicate that the effect of entrepreneurial intention is notable in the smaller period of time but weakens as the time horizon expands, underscoring the temporal persistence of these intentions. Recognizing entrepreneurial aspiration as a strong indicator of entrepreneurial action (Arasti et al., 2012; Krueger et al., 2000; Autio et al., 2001), current research increasingly prioritizes the study of EI (Yu et al., 2022).

Research and Development

The studies widely acknowledge the correlation between R&D investment and entrepreneurship (Audretsch & Link, 2019), emphasizing the relevance of innovation and early-stage entrepreneurial activity for regional competitiveness (Novejarque Civera et al., 2021). Researchers have specifically investigated the association between research and innovation investment and the growth of rural areas, recognizing its crucial role in that context (Elena et al., 2015).

Institution Framework

An effective institutional framework, marked by good governance, a strong rule of law, regulatory quality, streamlined bureaucracy, and credit access, fosters entrepreneurship. Bjørnskov and Foss (2013) assert that institutions influence economic growth. Business startup procedures and regulations impact entrepreneurship, subsequently affecting economic growth. Furthermore, there is a noteworthy influence of beliefs, culture, and social values in forming regional entrepreneurship (Baumol & Strom, 2007; Audretsch & Keilbach, 2008).

Unemployment rate

Studies including Fritsch et al. (2015) and Fuentelsaz et al. (2015) propose a favourable association between entrepreneurship and unemployment, arguing that necessity-driven entrepreneurship increases during periods of joblessness. However, studies by Blanchflower and Oswald (1998); Blanchflower (2000); Desai et al. (2003); Novejarque, Pisá & López-Muñoz (2021); and Fuentelsaz et al. (2015) observe a negative relationship, suggesting that opportunity-driven entrepreneurship, responding to market signals, is more prevalent.

Table 1: Description of variables

Variables	**Description**	**Sources**
TEA	Percentage of population involved in total early-stage entrepreneurial activity	GEM
NECESSITY	Entrepreneurs who have started business due to necessity	GEM
OPPORT	Entrepreneurs who have started business after seeing an economic opportunity	GEM
ESTBO	Percentage of businesses established for more than three years	GEM
EINT	Do you anticipate commencing a new business, either individually or in collaboration with others, during the next three years, encompassing any form of self-employment?	GEM
KNOWT	Have you directly acquainted with somebody who initiated a business inside the last 2 years?	GEM
FOF	Would the apprehension of failure hinder you from initiating a commercial venture?	GEM
STATUS	Percentage f population who thinks that being an entrepreneurs will improve their social status.	GEM
RNDEXP	Expenditure on research and development as the percentage of GDP	WDI
UNEMP	Annual unemployment rate	WDI
GDP	GDP at constant price	WDI
INST	Regulatory quality index	WGI

Source: GEM APS and WGI data 2005-2020

Model Specification

To test the hypotheses, the study uses both fixed and random effects panel estimates to account for country and temporal effects (Cumming et al., 2016). This framework enables us to account for unobserved variability across nations and throughout time in a single model. As indicated by Baltagi (2008) uses two-way error component disturbances to estimate the regression model given by equation (1). Equation (2) incorporates the unobservable nation impact (Baltagi, 2008), the unobservable time effect, and the residual stochastic disturbance term. It is important to note that the above equation is country-independent and accounts for any time-specific effects that were not incorporated in the model.

$$Y_{it} = \beta X_{it} + \epsilon_{it} \quad \text{……..(1)}$$

$$\epsilon_{it} = \delta_i + \delta_t + \varepsilon_{it} \quad \text{…….(2)}$$

where Y_{it} indicates the level of entrepreneurship (TEA, OPPO_ENT and NEC_ENT) in country i in year t; X_{it} represents the set of independent variables; ϵ_{it} is the error term; and β is the coefficient of the dependent variables and the constant. The error term ϵ_{it} contains unobservable country- and time-specific effects and the residual disturbance ε_{it} is identically and independently distributed.

Empirical models

The following equations provide the three desired models for our analysis. Here, equation (3) is formulated for the total early entrepreneurs, while (4) and (5) are for necessity and opportunity entrepreneurs, respectively.

$$TEA_{it} = \beta_0 + \beta_1 ESTBO_{it} + \beta_2 EINT_{it} + \beta_3 KNOWT_{it} + \beta_4 FOF_{it} + \beta_5 STATUS_{it} + \beta_6 RNDEXP_{it} + \beta_7 UNEMP_{it} + \beta_8 lnGDP_{it} + \beta_9 INST_{it} + \epsilon_{it} \quad \text{……..(3)}$$

$$NECESSITY_{it} = \beta_0 + \beta_1 ESTBO_{it} + \beta_2 EINT_{it} + \beta_3 KNOWT_{it} + \beta_4 FOF_{it} + \beta_5 STATUS_{it} + \beta_6 RNDEXP_{it} + \beta_7 UNEMP_{it} + \beta_8 lnGDP_{it} + \beta_9 INST_{it} + \epsilon_{it} \quad \text{……..(4)}$$

$$OPPORT_{it} = \beta_0 + \beta_1 ESTBO_{it} + \beta_2 EINT_{it} + \beta_3 KNOWT_{it} + \beta_4 FOF_{it} + \beta_5 STATUS_{it} + \beta_6 RNDEXP_{it} + \beta_7 UNEMP_{it} + \beta_8 lnGDP_{it} + \beta_9 INST_{it} + \epsilon_{it} \quad \text{……..(5)}$$

Result and Interpretation

Table 2 describes the general characteristics of the variables used in the study. The current study focuses on 24 countries in the Asia-Pacific region from 2005 to 2020. The table shows that

around 11.31 per cent of the population are engaged in early-stage entrepreneurial activities. It shows that seven out of ten entrepreneurs are necessity-driven. Approximately one-fourth of entrepreneurs engage in entrepreneurial activity due to the discovery of an opportunity. The table suggests that roughly 8.9 per cent of the residents owns businesses established for more than three years. Around one out of five individuals intend to establish a firm in the next two years. It also describes that 38 per cent of the population fears starting a business. Along with that, seven out of ten individuals find entrepreneurship a socially respectable profession. Over one-third of the public is aware of someone who has launched a business within the last two years. From a macro perspective, on average, the selected countries spend 1.37 per percent of their GDP on research and development.

Table 2 Descriptive statistics

Variable	Obs.	Mean	SD	Min	Max
TEA	257	11.31	5.38	1.48	30.15
NECESSITY	193	71.38	11.23	39.29	92.19
OPPORT	193	24.58	10.92	0.00	56.13
ESTBO	256	8.94	5.98	1.26	33.20
EINT	250	22.53	13.33	0.75	66.05
KNOWT	217	36.22	16.47	7.65	81.96
FOF	257	38.72	10.74	7.14	75.42
STATUS	234	73.87	12.02	44.98	96.73
RNDEXP	332	1.37	1.30	0.04	5.71
UNEMP	552	5.33	3.65	0.10	19.84
GDP	551	20712.65	19685.66	778.51	81608.57
INST	527	62.98	25.28	2.87	100.00

Source: GEM APS and WGI data 2005-2020

Table 3 presents covariance matrix of the variables used in the study. It shows a positive correlation between early-stage entrepreneurial activity (TEA), established business ownership (0.68), entrepreneurial intention (0.59), entrepreneurship expertise (0.42), and perceived social status (0.53). The correlation between necessity-driven and opportunity-driven entrepreneurship is -0.95. Status (0.62) and expertise (0.44) increase entrepreneurial drive, but unemployment (-0.07) and institutional quality (-0.48) lower it. R&D expenditure correlates positively with GDP (0.60) and institutional quality (0.63) but adversely with total

entrepreneurial activity (-0.43) and motivation (-0.39). The positive correlation between GDP and institutional quality is 0.83, and the inverse relationship between unemployment and many entrepreneurial traits suggests mutual reinforcement.

Table 3 Correlation matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1-TEA	1											
2-NECESSITY	-0.10	1.00										
3-OPPORT	0.14	-0.95	1.00									
4-ESTBO	0.68	-0.04	0.13	1.00								
5-EINT	0.59	-0.31	0.28	0.27	1.00							
6-KNOWT	0.42	-0.06	0.09	0.17	0.44	1.00						
7-FOF	-0.01	0.11	-0.15	0.09	-0.11	0.07	1.00					
8-STATUS	0.53	-0.19	0.16	0.23	0.62	0.51	0.14	1.00				
9-RNDEXP	-0.43	0.07	-0.10	-0.32	-0.39	-0.32	0.06	-0.34	1.00			
10-UNEMP	-0.21	-0.26	0.20	-0.35	0.07	-0.08	-0.15	0.12	0.00	1.00		
11-GDP	-0.42	0.43	-0.46	-0.42	-0.40	-0.42	0.01	-0.30	0.60	-0.11	1.00	
12-INST	-0.39	0.51	-0.54	-0.31	-0.48	-0.44	0.05	-0.45	0.63	-0.34	0.83	1.00

Source: Authors Estimation

Table 4 indicates the degree of multicollinearity among the variables using VIF. It suggests the institutional quality is collinear with other variables. The mean VIF of 2.44 indicates that, on average, the variables exhibit low multicollinearity. The result suggests that multicollinearity is not a significant concern in this dataset. The findings show that multicollinearity is not a serious issue in this dataset.

Table 4 Variance Inflator Test

Variables	VIF	1/VIF
INST	5.49	.182
GDP	3.972	.252
STATUS	2.311	.433
EINT	2.035	.491
UNEMP	1.85	.54
KNOWT	1.843	.542
RNDEXP	1.804	.554
ESTBO	1.55	.645

FOF	1.106	.905
Mean VIF	2.44	

Source: Authors Estimation

The table 5 presents the result of random effect model for total early, opportunity as well as necessity entrepreneurs. The result suggests that the presence of established business owners, entrepreneurial intension have a positive and significant impact over the total early entrepreneurs. The result shows negative and insignificant relationship of total early entrepreneurs with expenditure on research and development as well as unemployment rate in current year. Interestingly there is significant and negative association between total early entrepreneurs and expense on research and development. Further it shows that the lagged values of established business owner as well as the entrepreneurial intension have a significant influence over the total early entrepreneurs.

Table 5 Result of random effect model for total early, opportunity and necessity entrepreneurs.

VARIABLES	**Total early entrepreneurs**	**Opportunity Entrepreneurs**	**Necessity entrepreneurs**
ESTBO	0.460***	-0.0417	0.202
	(0.0664)	(0.168)	(0.191)
EINT	0.0926***	0.0253	-0.0697
	(0.0319)	(0.0788)	(0.0850)
KNOWT	0.0498**	-0.153**	0.187***
	(0.0234)	(0.0629)	(0.0684)
FOF	-0.0314	0.0289	-0.0253
	(0.0292)	(0.0768)	(0.0828)
STATUS	0.0452	-0.0211	-0.0555
	(0.0367)	(0.102)	(0.110)
RNDEXP	-0.492	-0.209	0.643
	(0.392)	(1.420)	(1.610)
UNEMP	-0.0145	0.00515	0.128
	(0.154)	(0.441)	(0.491)
lnGDP	1.81e-05	-0.000199	0.000211
	(4.08e-05)	(0.000127)	(0.000143)
INST	0.0214	-0.159	0.124

	(0.0326)	(0.103)	(0.116)
One period lag			
lESTBO	0.251***	-0.0468	0.132
	(0.0776)	(0.172)	(0.208)
lEINT	0.0899*	0.0163	0.00640
	(0.0460)	(0.108)	(0.115)
lKNOWT	0.0139	-0.155**	0.167**
	(0.0306)	(0.0671)	(0.0771)
lFOF	-0.0301	-0.170*	0.0914
	(0.0379)	(0.0922)	(0.100)
lSTATUS	0.0978*	0.0270	-0.0296
	(0.0505)	(0.117)	(0.135)
lRNDEXP	-0.705**	3.749***	-2.708*
	(0.357)	(0.942)	(1.425)
lUNEMP	-0.330	-0.985**	0.340
	(0.202)	(0.498)	(0.618)
lnlGDP	3.28e-05	6.87e-05	6.59e-05
	(4.52e-05)	(0.000126)	(0.000166)
lINST	-0.0173	-0.489***	0.371***
	(0.0375)	(0.0953)	(0.123)
Two period lags			
l2ESTBO	0.265***	-0.161	0.270
	(0.0920)	(0.194)	(0.215)
l2EINT	0.0908*	0.172	-0.241*
	(0.0537)	(0.126)	(0.140)
l2KNOWT	0.0482	-0.147*	0.155*
	(0.0380)	(0.0836)	(0.0924)
l2FOF	-0.0768*	-0.0846	-0.0539
	(0.0420)	(0.0999)	(0.111)
l2STATUS	0.0813	-0.136	0.146
	(0.0605)	(0.134)	(0.148)
l2RNDEXP	-0.985**	4.710***	-4.938***
	(0.416)	(1.007)	(1.114)
l2UNEMP	-0.106	-1.356**	0.812
	(0.265)	(0.646)	(0.715)
lnl2GDP	-8.59e-06	0.000199	-7.39e-05

	(4.88e-05)	(0.000138)	(0.000153)
l2INST	0.0370	-0.590***	0.515***
	(0.0443)	(0.108)	(0.119)
Constant	56.62***	41.61***	34.32**
	(11.58)	(13.42)	(13.64)

Source: Authors Estimation

The study reveals that the acquaintance with the fellow entrepreneurs significantly reduces the probability of being an opportunity entrepreneur in different time periods. Further, it suggests that the lagged value of unemployment rate and institutional quality in an economy has negative and significant impact over opportunity entrepreneurs. It suggests that high unemployment rate in the economy reduces the numbers of opportunity entrepreneurs. Furthermore, the result shows a positive and significant relationship between expense on research and development and the opportunity entrepreneurs. That is the expenditure made on research and development significantly improves the number of opportunity entrepreneurs.

The result suggests that the acquaintance with fellow entrepreneurs significantly improve the probability of being a necessity entrepreneur. There is a positive and significant relationship between institutional quality and necessity entrepreneurs. That is the institutional quality improves the probability of being a necessity entrepreneur. Further the result suggests a negative and significant relationship between expenditure on research and development and necessity entrepreneurs.

Post Estimation Test

Table 6 shows the post-estimation test findings used in the study. The Brusch Pegan test validates the existence of heteroskedasticity in the variance. The *p-value* is less than 0.05, indicating the presence of viability in the variance of error term. To resolve the problem of heteroskedasticity the study uses the robust standard error in the panel regression. The Hausman test serves as a litmus test for determining whether a random or fixed effect should be used in the study. As the *p-value* is greater than 0.05, we will reject the null hypothesis and conclude that the random effect model will be appropriate in the study.

Table 6 Postestimation test result

Name of test	Description	Coefficient value	Chi squared value	*P values*

Hausman test	Model selection	15.048		0.058*
Brusch Pegan test	Heteroskedasticity		777.54	0.000***

Source: Authors Estimation

Discussion

The findings suggest that fear of failure negatively influences early entrepreneurship in an economy. Brünjes and Diez (2013) also claim a similar result: that entrepreneurial activities are negatively influenced by fear of failure. Morales-Gualdrón and Roig (2005) have also found that the negative relationship between fear of failure and opportunity, as well as necessity entrepreneurship, is more pronounced. A study suggests that entrepreneurial intention significantly influences the total early start-ups in the economy. Arasti et al. (2012) also claim that the entrepreneurial intentions of individuals determine the entrepreneurial activities of an economy. Studies of Klyver & Grant (2010) and Wagner (2006) suggest that acquaintance with fellow entrepreneurs will increase the possibility of being an entrepreneur and hence the entrepreneurial activity. The evidence also confirms a favorable association between entrepreneurial activity and the presence of a role model for an individual.

The finding shows that the negative association between entrepreneurial activity and unemployment rate, but remain statistically insignificant in the study. The study reveals an inverse association between the rate of unemployment and the numbers of opportunity entrepreneurs. When there is economic prosperity and low unemployment rate in the economy there will be a rise in the numbers of opportunity entrepreneurs. Novejarque, Pisá & López-Muñoz (2021) and Fuentelsaz et al. (2015) have also confirmed the negative association between unemployment rate and opportunity entrepreneurship. The institution's quality acts as a crucial factor in determining the entrepreneurial activity in the economy. There is no significant association between institutional quality and total early entrepreneurs. Rather, there is substantial evidence of positive relation between necessity entrepreneur and institutional quality. On the other side the findings suggest the negative association between opportunity entrepreneurs and institutional quality. Additionally, Baumol & Strom (2007) concludes that there is a strong correlation between entrepreneurial activity and institutional quality.

The current study attempts to find the reason behind the entrepreneurial variation across the nation by tackling some earlier limitations. However, its existence does not imply that the current study is free from limitations. The ongoing research has used number of early-stage entrepreneurs from the GEM database as an indicator of entrepreneurial activity in the

economy. GEM further classifies the entrepreneurs as opportunity and necessity entrepreneurs. But it does not distinguish. Unfortunately, due to data limitations, the study is unable to differentiate between the registered and unregistered entrepreneurs. Similarly, future research can build on the findings by investigating the effects of certain types of financial or human capital in diverse institutional contexts.

Conclusion

The question of differences in entrepreneurship rates between the nations is not a novel observation. As entrepreneurship actively contributes to economic growth and development, the differences in entrepreneurship rates among nations reflect global inequalities in growth paths. Earlier studies have focused on the demand and supply sides of entrepreneurship as the economy's key determinant. The current study employs the knowledge spillover theory to explain the variation in the entrepreneurial activities across the nations. The objective of the research is to detect the time-dependent factors influencing the entrepreneurship rate across the 24 selected countries. The findings indicate that the lagged values of regressor in the study influences the entrepreneurship rate in the economy.

The study concludes that the presence of entrepreneurial network, institutional quality, opportunity perception significantly affects the total business activity in the economy. It also concludes that these determinants have long term impact on the generation of newly established entrepreneurial activity in the economy. Investment in research and development has a significant impact on entrepreneurial activity in the economy. The increase in spending on research and development will negatively influence the necessity entrepreneurs while it will encourage the creation of new knowledge as well as innovation in the economy. Thus, increasing R&D expenditure will increase the opportunity entrepreneurs in the long run.

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